

Developing, Maintaining, and Evaluating a Sampling Frame of Institutions

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THE KEYSTONE for all sample surveys is a frame which identifies every unit in the population to be studied, because the results of a survey can at best represent only the frame from which the sample is selected. In the health records survey, a major program of the Public Health Service's National Center for Health Statistics, the unit to be measured is usually a person living in an institution, hospital, or other health-related establishment, or a person discharged from a short stay hospital. The unit might be an employee of an establishment or even the establishment itself.

Conceptually, there are a number of ways to construct sampling frames which contain all such units. For example, the United States, subdivided into counties, cities, and precincts, could be the frame. From this frame a probability sample of counties could be selected and all establishments within scope of the survey identified by canvassing the sample areas. A second stage would be selecting the required elementary unit, such as a resident of the institution or a hospital discharge record, within these establishments. For some purposes this scheme would probably produce satisfactory results at a reasonable cost.

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A more efficient procedure would be to list all the establishments in the universe and use that list for the sampling frame, especially if the survey is to be continuous or repeated at frequent intervals. List frames have definite advantages over geographic area frames for several reasons. They are much easier to classify into homogeneous groups, and their use eliminates one stage of sample selection or one source of sampling variance. It is feasible also to collect information required for optimum sample designs from all establishments in the frame through mail surveys at low cost.

One major qualification should be made concerning list frames, however. Unless the population is small and confined to a compact area, it is usually impossible to list all units and to know how many units are not listed. It is possible to evaluate the underrepresentation, however, by use of a multiframe technique—for example, using both a list of establishments and a probability sample of small land areas selected from an area frame containing all the establishments in the universe. This multiframe technique is used by the Division of Health Records Statistics, Public Health Service, for a continuing nationwide hospital discharge survey and a series of ad hoc institutional population surveys.

The sampling frame used in health records surveys, called the Master Facility Inventory (MFI), consists of “all” general and specialty hospitals; resident care institutions such as nursing, convalescent, and children's homes; and custodial care homes such as penal, correc-

tional, and detention facilities in the United States. This paper describes the procedure used and some of our experiences in developing, evaluating, and maintaining the MFI. More detail on the methodology and the content of the inventory has been published elsewhere (1).

Development of the Inventory

There were three basic operations in the development of the inventory. First, we determined what files of names and addresses of establishments were available in the United States, and which of the files should be merged to produce the most complete list. Second, the selected files were matched to eliminate duplicate names. Finally, a questionnaire was mailed to each address on the list to determine if the place was still operating and to collect information for classifying the establishments by type, service, ownership, and size.

The mailing list was essentially the result of collating files of four Federal agencies, each containing between 20 and 30 thousand addresses. Additional establishments were added to the list by matching names in directories maintained by national associations and organizations, and in State licensure files for nursing homes and related facilities.

The matching procedure, done before the survey, was simple, primarily because little information was available for comparisons. The principal factors were name and address, but other information such as number of beds, type of ownership, and type of business was used when available. The criteria for a match were not strict. If there was any doubt concerning the match, the establishment was considered a non-match and was included in the mailing list. This procedure insured maximum coverage, but also resulted in the inclusion of many duplicates, an undesirable trait of a sampling frame. We thought that duplicates could be identified and removed from the list while questionnaire returns were being processed on the basis of information from respondents. Unfortunately, our expectations were not fully realized.

Matching and mail inquiries were carried out in three stages in about a year and a half. The first stage was a survey of about 39,000 addresses during spring 1962, the second a survey of near-

ly 5,000 addresses during fall 1962, and the third a survey of about 2,200 addresses during July through September 1963. Survey materials and procedures were virtually identical in each stage. The procedure involved an initial letter by first-class mail, two followup letters to non-respondents spaced about 3 weeks apart, and telephone calls to establishments not responding to mail inquiries. The first mail followup was by first-class mail, the second by certified mail.

The exact response rate is not known because we could not be sure if nonresponding establishments were in business or within scope of the inventory. If the facilities definitely known to be out of business, out of scope, or duplicates were not considered, the nonresponse rate was 7 percent. We have learned from sample surveys, however, that about three-fourths of the nonrespondents considered in calculating that figure were not in operation or were out of the scope of the inventory. The nonresponse rate, therefore, was somewhat less than 7 percent.

More than 5,000 questionnaires were returned by respondents whose establishments had gone out of business. This indicates the effectiveness of a mail survey of establishments in reaching intended respondents (see table). The fact that a large proportion of the questionnaires was delivered is surprising because full mailing addresses were not known for about a fourth of the places on the list.

Classification Procedures

An important aspect of the MFI is the classification of establishments by nature of business. Both the questionnaire format and a set of specified criteria which were applied to information collected in the survey were essential in classifying hospitals and institutions. The format made it possible to classify any type of establishment, whether it was in scope or not.

The questionnaire was designed to classify into three broad categories any establishment on the mailing list. The categories were hospitals; establishments which provide nursing, personal, and domiciliary care; and "other" establishments. Specific types, such as nursing home, rest home, home or school for the deaf, prison, or hospital, were listed under these categories. The respondent, usually an administrator or

Distribution of addresses in the Master Facility Inventory survey by status of response

Status of response	Number
Total questionnaires mailed.....	46, 336
Completed questionnaires received, establishments in business and in scope.....	28, 133
Nonresponse.....	2, 035
Questionnaire returned by post office, place judged to be possibly in business and in scope.....	1, 285
Questionnaires not returned.....	750
Out of scope, out of business, or duplicate.....	16, 168
Questionnaires returned by respondent:	
Out of business.....	5, 337
Out of scope.....	4, 569
Duplicate.....	2, 710
Questionnaires returned by post office: Out of business or building torn down.....	3, 552

proprietor, was asked to choose the category which best described his establishment. Except for places classed as nursing, personal, or domiciliary care establishments, the respondent's classification has been used in the MFI for sample design purposes.

Subsequent sample surveys have shown that if the respondent classifies his place as a hospital, for example, only rarely is it not a hospital as defined by minimum standards. The names of places providing nursing, personal, or domiciliary care, however, are not so highly correlated with the type of service provided. Establishments called nursing homes do not necessarily provide nursing care as the primary and predominant type of service. Consequently, for such establishments it was necessary to find some scheme for refining the classification indicated by the respondent.

The classifications adopted made it possible to sort nursing, personal, or domiciliary care homes into the following four groups according to their primary and predominant service and to determine which establishments were not within scope of the inventory.

1. A nursing care home provided nursing care to 50 percent or more of the residents during the week prior to the day the questionnaire was completed and had at least one registered professional nurse or licensed practical nurse working 15 or more hours per week.

2. A personal care home with nursing pro-

vided some nursing care but did not meet the conditions required to be a nursing care home.

3. A personal care home did not provide nursing care to any residents during the reference week but routinely provided three or more of the six personal services specified on the questionnaire (help with tub bath or shower, dressing, correspondence or shopping, walking or getting about, eating, and the provision of rub and massage).

4. A domiciliary care home provided care primarily to residents able to care for themselves. Such a home has an accepted responsibility for the personal well-being of its residents and provides personal services as needed. A domiciliary care home routinely provided one or two of the specified personal services and did not provide nursing care to any of its residents during the week prior to the day the questionnaire was completed.

If room and board was the only service provided by an establishment, it was ruled out of scope.

Duplication of Units in Sampling Frame

Many duplicates remained in the list after final processing of survey returns despite our attempts to identify and remove them. An intensive search for duplicates was made later and, hopefully, only a negligible number were undetected. A major reason for lack of duplication control was that the MFI was compiled in three stages over a year and a half.

If all addresses were surveyed at approximately the same time, the respondent would be less likely to complete several questionnaires since he could be asked to indicate on any duplicate forms that a questionnaire had already been completed. There are other factors which contribute to duplication. Many establishments have more than one name, use a mailing address different than their location, or are part of a multiunit facility so that a given unit may or may not be listed separately in the MFI.

To help control duplication, several steps might be taken. One is to collect from the respondent all names by which the place is known, telephone number, location of the establishment if different from mailing address, ZIP code, owners' names, and other information to uniquely identify each establishment. Another

is to edit the names and addresses to some standardized form to make conduct of duplicate searches by a computer or other device feasible.

There are several reasons for eliminating duplicate listings in the MFI. For one, the inventory is a source of national statistics on the number and types of hospitals and institutions in the United States. Duplicates would bias the statistics. Also, samples drawn from a duplicated frame would yield biased estimates unless the probability of selection for each sample unit could be determined. Conceptually this can be done, even though all duplicates in the frame are not known. This procedure is to select a probability sample of the units listed, then identify all duplicates in the sample as well as the duplicates listed in the frame for the sample units. If the frame is not stratified and a common sampling fraction applies to all units listed, determining the probability of selection for the duplicates is not too difficult.

The problem is more complex if stratification and differential sampling rates are used. Even for relatively small frames such as the master facility inventory, a duplicate search after sample selection is very laborious and time-consuming. Moreover, after such a search, duplicates may not all be identified, and estimates based on the sample survey will be biased to the extent that duplicates are included. In addition, duplication makes estimation more complex since varying size weights must be assigned the duplicate cases. These varying weights, in turn, tend to increase the variance of the estimate.

Evaluation of Coverage

The importance of knowing the completeness of the frame when conducting sample surveys cannot be overemphasized. Whether results of health records surveys are national estimates largely depends upon the MFI including all facilities in the nation. We had believed that the newly developed MFI included all but a negligible number of hospitals and institutions in the United States. This belief, however, reflected only subjective evaluations based primarily on the fact that the inventory was developed by merging several large files and was the most complete file of its kind. Such subjective evaluations did not permit definitive statements about the inventory's completeness,

and some objective method of evaluation obviously was needed.

The most obvious procedure, comparison with other establishment lists, was ruled out almost immediately, since other known files were generally much more limited in scope and their degree of completeness was also unknown. The most accurate procedure would be to make a personal canvass of the entire United States, which was not practicable if indeed possible.

There is a multiframe method that provides an objective measurement of the comprehensiveness and completeness of a file such as the MFI without the use of any other file or list. The method involves the overlap between the list frame and an area frame that contains all establishments in the universe of interest. The underrepresentation of the MFI could be assessed by estimating the total number of establishments in the universe through use of probability area sampling and comparing the estimate with the number of establishments in the list frame. A better method is to match each establishment in the area sample with the list frame and measure the underrepresentation in the list based directly on the subsample of places which do not match. The second method is preferable since it requires a smaller sample for a given degree of precision as the underrepresentation in the list frame becomes smaller. In addition, if the sample is large enough, it is possible to determine the amount of underrepresentation in the list for various types of facilities.

Conducting an independent survey solely to evaluate the MFI would be expensive. Fortunately, a national survey already existed in the National Center for Health Statistics, the health interview survey (2,3) which, with some modifications, would provide a suitable second frame for a multiframe study. The survey, in operation for several years, routinely identifies all hospitals and institutions in its sample areas. Its use presented some problems, primarily because it was designed as a household survey and identification of institutions in the sample areas was essentially a byproduct of the survey operation. Some tightening of controls on reporting of institutional names, as well as improvement in reporting of type of institutions involved, was

needed. Also, the relatively small sample of the health interview survey contains an even smaller sample of hospitals and institutions in scope of the MFI, and consequently only gross estimates of undercoverage in the MFI can be made. There were, of course, some advantages to using the ongoing survey, a major one being the small cost involved.

The results of this evaluation study, referred to as the complement survey, indicated that the first attempt at developing a national inventory of hospitals and institutions had been relatively successful. It was found that at the time it was developed, the MFI was about 90 percent complete in terms of facilities and about 95 percent complete in terms of beds. Although the sample was small, it provided a rough idea about coverage by type of establishments. The most complete coverage seemed to be for hospitals, with all hospitals in the area sample also in the MFI. Coverage for nursing and personal care homes was about 90 percent complete; for other types of institutions, coverage was about 80 percent complete.

Maintaining the Inventory

An increasing number of new hospitals and institutions begin operation each year, many go out of business, and ownerships, names, and services offered to patients change frequently. This is particularly true with nursing and personal care homes, which comprise more than half of the MFI. Therefore, some updating procedure was necessary if the inventory was to remain complete for any length of time.

The main concern in updating the file was to identify new facilities. Other changes, such as name and address changes and facilities going out of business, could be made through direct contact with the facilities. In fact, periodic surveys of the MFI are contemplated to detect these changes. Some input system was needed, however, for adding new places.

The first approach to obtaining names and addresses of new establishments was based primarily on lists provided by the Social Security Administration, the Public Health Service, and additions to published lists such as that in the Guide Issue of *Hospitals*, the journal of the American Hospital Association. Although

these sources undoubtedly list a large proportion of all new establishments, certain parts of the MFI will gradually deteriorate unless other list sources are included in the input system.

A systematic approach at the State level was needed because nearly all facilities in the inventory are regulated or controlled by one or more State agencies. For types of facilities not subject to the control of a State agency, other sources must be identified, such as agencies of the Federal and local governments.

The first step in establishing the updating system, the Agency Reporting System, was to determine which State offices might maintain a file on hospital or institution names. We found that most such files are maintained by agencies which either exercise some regulation or control over the hospitals and institutions in their State, are responsible for the administration of such facilities, or keep a file of establishment names as a byproduct of their normal operations, such as vital statistics code lists and service directories of available child care facilities. In addition to searching directories for potential source agencies, officials of the major departments in each State government were contacted by telephone in an effort to identify every agency which might have a file of interest.

It was then necessary to determine which agencies actually did maintain files and to solicit certain information concerning the size, nature, availability, and coverage of the files. This was done through a mail survey. Also surveyed by mail, personal visit, or both were Federal and local government agencies and some 90 non-government organizations. The goal of the survey was to identify a minimum set of agencies and organizations in the United States which can provide the names and addresses of "all" hospitals and institutions opening each year and to collect the names and addresses of all establishments currently in their files.

The next steps are to update the MFI mailing list using the State and national lists obtained in the survey, make advance arrangements with the selected agencies to obtain an annual list of new places added to their files, and resurvey the updated MFI. The plan is to survey new establishments annually and the entire inventory biennially. The biennial surveys will provide not

only current information needed for sample design and estimation purposes, but also national statistics on the number and types of hospitals and institutions in the country and changes that have occurred since the last survey.

An important methodological feature of the updating system is a built-in evaluation procedure. Analysis of the listings and associated information reported by the organizations in the Agency Reporting System will help to identify significant gaps in coverage in each State. Sources for the names of the missing facilities might then be sought. Also, because 100 percent coverage in every State is not possible it is important to be able to specify what types of facilities are not included in the MFI in each State and the reasons for their omission.

Other methods of evaluating coverage in the inventory, especially the complement survey, will be used. Ordinarily the complement survey will be conducted at a time which coincides with the biennial MFI surveys. However, if the Agency Reporting System provides almost perfect coverage, the complement survey can be conducted less frequently.

Summary and Conclusions

The Master Facility Inventory (MFI), developed as a sampling frame of hospitals and institutions in the United States, though reasonably complete, had some obvious deficiencies. The lack of a reliable input system for the addition of new facilities was the most serious weakness. In addition, control of duplication within the file was insufficient, and the evaluation procedures could not identify specific areas of underrepresentation. These and some lesser problems have led to a redevelopment of the inventory and the establishment of a national agency reporting system.

The agency reporting system should provide

the names and addresses of nearly all new facilities in the United States that begin operating each year. Through a State by State analysis of the new facilities reported, some evaluation of coverage should be possible to supplement the complement survey studies, area samples which, when matched with the MFI, measure the underrepresentation in the list based on the subsample of places which do not match.

To aid in elimination of duplicates and improve the identification and classification of facilities, name and address can be edited to some standard format and fixed fields on the computer record assigned to each part of the name and address. Additional identification information can be obtained such as alternate names, mailing addresses, telephone numbers, and names of subunits. This information aids in duplicate control.

The goal of the MFI program is a complete, comprehensive and up-to-date inventory of hospitals and institutions. With the continued cooperation of the facilities in the file and the organizations participating in the Agency Reporting System, it is felt that the MFI will be an invaluable tool in providing health statistics on the nation's hospitalized and institutionalized population.

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Nursing Care of the Aged. An annotated bibliography for nurses. *PHS Publication No. 1603; 1967; 131 pages; 75 cents.* Contains 529 annotated articles covering the 12-year period 1954-65. Includes a content index, an annotation index, and an author index. Publication will assist nurses in identifying literature relative to the nursing care needs of the aged.

Alcohol and Alcoholism. *PHS Publication No. 1640; 1967; 73 pages; 50 cents.* Reviews present knowledge of alcohol and the nature and extent of drinking problems. Discusses the identification, treatment and prevention of alcoholism, and the status of current research. Points out that alcohol can no more be considered the sole cause of alcoholism than marriage can be considered the sole cause of divorce, or the tubercle bacillus the sole cause of tuberculosis. Also points out that available evidence seems to demonstrate that long-lasting results can be achieved primarily by a technique known generally as psychotherapy.

Guide to MEDLARS Services. *PHS Publication No. 1694; October 1967; 22 pages.* Assists users of the National Library of Medicine's MEDLARS demand search services. Discusses the capabilities, limitations, and conditions under which searches are made to produce demand bibliographies.

Laboratory Methods for Clinical and Public Health Mycobacteriology. *PHS Publication No. 1547; April 1967; by George P. Kubica and William E. Dye; 90 pages; 45 cents.* Discusses theoretical, technical, and safety aspects of isolation, identification, and drug susceptibility testing of mycobacteria, including tubercle bacilli, recovered from man. Presents methods for collection and transportation of clinical specimens; techniques for digestion,

decontamination, and concentration of clinical materials; staining technology; culture media, including isolation procedures and drug susceptibility testing, both direct and indirect; methods for preliminary identification of acid-fast bacilli recovered from man; and methods for reading and reporting of laboratory findings to clinicians or other public health officers. Explains each procedure in detail and lists sources for most equipment and supplies. Contains a 16-page section of photographs, some in full color. This manual will be useful to those seeking standardized laboratory methods in order to supply physicians with rapid and precise information, particularly for diagnosis and treatment of tuberculosis.

Directory of State and Territorial Health Authorities. *PHS Publication No. 75; 1967; 118 pages; 50 cents; revised.* Lists health department personnel of each State and territory so as to reflect the organizational pattern of the department. Lists State and territorial health officers, showing title, headquarters address, area code, and telephone number of each health department. Presents a separate listing of all single State agencies designated to administer the new comprehensive State health planning grant program. Gives similar information for State agencies other than health departments administering grant programs of the Public Health Service and the crippled children's grant program of the Children's Bureau.

Program Guide for National Poison Prevention Week. *PHS Publication No. 1709; October 1967; 12 pages.* Presents a guide, in flip-chart form, to promote a coordinated campaign for National Poison Prevention Week. Discusses financial arrangements, use of exhibits and displays, organization of speakers' bureaus, use of the communications media,

presentation of programs to community groups and schools, arranging for official proclamations, and planning of special projects. Includes an order form for selected materials. Publication is designed for adaptation by local communities, using indigenous resources, supplemented by promotional materials made available by the National Planning Council for Poison Prevention Week and its individual members.

Smallpox. *PHS Publication No. 230, Health Information Series No. 27; revised 1967; leaflet; 5 cents, \$3 per 100.* Gives a brief statement on the ancient scourge that still attacks many of the less well-developed parts of the world. Discusses the disease, vaccination, the way it spreads, and what the illness is like.

Pesticides. *PHS Publication No. 1081, Health Information Series No. 112; leaflet revised February 1967; 5 cents, \$3.25 per 100.* Presents uses and hazards of pesticides and describes general safety measures as well as those to be practiced before, during, and after application of pesticides.

Directory of Ongoing Research in Smoking and Health. *PHS Publication No. 1665; 1967; 228 pages; \$1.25.* Lists 336 projects with descriptions of research in such diverse fields as chemistry, biology, psychology, sociology, plant genetics, and education. Projects are located in 48 States, the District of Columbia, and 30 foreign countries.

Distribution of Cobalt 60, Zinc 65, Strontium 85, and Cesium 137 in a Freshwater Pond. *PHS Publication No. 999-RH-24; by William A. Brungs, Jr.; March 1967; 52 pages.*

Presents data obtained on the physical, chemical, and ecological distribution of four radionuclides added to a small pond. The conditions were comparable to those in an accidental release of radionuclides to an impoundment.

Cobalt 60, zinc 65, strontium 85, and cesium 137 were added to a 30,000-gallon pond, with a sand substrate, and containing experimental biota. The pond was lined with a single 8-mil sheet of black polyethylene. Sampling from the pond con-

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tinued for 80 days. The quantities of radionuclides were determined with a gamma-scintillation spectrometer. Supplemental chemical and biological information on the artificial pond and an adjacent control pond provided a measure of the difference between these two environments. Results of the experiment were evaluated regarding plans for future work.

After 4 days, 10 percent of the cobalt 60, 6 percent of the zinc 65, and 5 percent of the cesium 137 remained in solution. Cobalt 60 and zinc 65 were associated principally with suspended solids, and cesium 137 with bottom sediments.

In general, soft parts of biota rapidly accumulated more radionuclides than hard parts, but gradually lost radioactivity as radionuclide concentrations in the water decreased. Clam and snail shells and fish bone usually accumulated zinc 65 and

strontium 85 until almost the end of the experiment. More zinc 65 than any of the other test radionuclides was found in soft parts of biota. Strontium 85 activities usually exceeded those of zinc 65 in shell and bone.

Young clams and snails accumulated more zinc 65 and strontium 85 than adult clams and snails. Strontium 85 concentrations in the soft parts of the clams were higher in adults. The maximum observed accumulation of strontium 85 occurred in the crayfish exoskeleton. Maximum activities of the other test radionuclides were observed in the tadpoles.

An X-ray Machine Simulator. *PHS Publication No. 1718; October 1967; 69 pages.* Consists of detailed instructions on constructing an electronic circuit that will simulate the

operation of an X-ray machine. Includes experiments of value in the instruction of X-ray technologists, residents in radiology, and electronics technicians, and in physics and engineering programs where it may be desirable to provide exercises in the use of the complete simulator or its components. The simulator can be used in any exercise intended to teach the circuitry and basic principles involved in an X-ray unit.

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PUBLICATION ANNOUNCEMENTS

Address inquiries to publisher or sponsoring agency.

Medicare and the Hospitals. Issues and prospects. By Herman Miles Somers and Anne Ramsay Somers. October 1967; 303 pages; \$6.75, cloth, \$2.50, paper. Brookings Institution, 1775 Massachusetts Avenue, NW., Washington, D.C. 20036.

A Guide for Health Technology Program Planning. 1967; 52 pages; 1-9 copies, \$1; 10-24 copies, 90 cents; 25 or more copies, 75 cents. National Health Council, 1740 Broadway, New York, N.Y. 10019, or American Association of Junior Colleges, 1315 Sixteenth Street, NW., Washington, D.C. 20036.

Culture and Alcohol Use. A bibliography of anthropological studies. Compiled by Robert E. Popham and Carole D. Yawney. Second edition. 1967; 52 pages; free. Addiction Research Foundation, 344 Bloor Street West, Toronto R, Ontario, Canada.

Occupational Disease in California, 1965. 1967; 45 pages; free, as long as supply lasts. Bureau of Health Education, California State Department of Public Health, 2151 Berkeley Way, Berkeley, Calif. 94704.

Impact of Environment on Accidental Injuries and Fatalities. Proceedings, 3d AMA Congress on Environmental Health Problems. 1966;

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Combining Public Health Nursing Agencies. A case study in Philadelphia. By Leon V. Hirsch, Martin S. Klein, Gertrude W. Marlowe, and Dorothy Wilson, principal investigator. Department of Public Health Nursing of the National League for Nursing, 10 Columbus Circle, New York, N.Y. 10019.

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The Physician's Career. Teaching outline on medical practice and community relations for physicians and medical students. Edited by Henry F. Howe, M.D. 1967; 99 pages; 75 cents, United States, its possessions, Canada, and Mexico; 45 cents, medical students, hospital interns, and hospital residents in those countries; and 90 cents, all other countries. Division of Socio-Economic Activities and Division of Scientific Activities, American Medical Association, 535 North Dearborn Street, Chicago, Ill. 60610.

Proceedings of the 6th Annual Sanitary and Water Resources Engineering Conference, June 1-2, 1967, Nashville, Tenn. Technical Report No. 13. Edited by Edward L. Thackston. 1967; 193 pages; \$4. Mr. Edward L. Thackston, P.O. Box 133, Station B, Vanderbilt University, Nashville, Tenn. 37203.

Occupational Disease in California Attributed to Pesticides and Other Agricultural Chemicals, 1965. Prepared by Goldy D. Kleinman. 1967; 35 pages. Bureau of Occupational Health, California Department of Public Health, 2151 Berkeley Way, Berkeley, Calif. 94704.

WITTE, JOHN J. (National Communicable Disease Center, Public Health Service), and **KARCHMER, ADOLF W.:** *Surveillance of mumps in the United States as background for use of vaccine. Public Health Reports, Vol. 83, February 1968, pp. 95-100.*

The incidence of mumps varies considerably from year to year without any apparent cyclic pattern. The highest incidence occurs during the early school years; however, cases continue into adulthood. Slightly more than 50 percent of reported

cases are in males. Mumps encephalitis is reported with a frequency of two to four per 1,000 reported cases of mumps. Approximately 70 percent of the encephalitis cases occur in males.

These data as well as published re-

ports on the incidence and morbidity of other complications of mumps will form the basis of recommendations for vaccine use. Improved and more meaningful surveillance information is essential to further delineate the epidemiology of mumps in the United States, to provide the most meaningful evaluation of vaccine effectiveness, and to provide the rationale for future recommendations for vaccine use.

WRIGHT, NICHOLAS H. (Population Council of New York): *Evaluation of a plastic intrauterine loop in a post partum family planning program. Public Health Reports, Vol. 83, February 1968, pp. 119-126.*

In a sample of a low-income, fertile population in Atlanta, Ga., pregnancy rates per 100 first insertions of an intrauterine plastic loop (size D) were 3.2 ± 1.1 , and expulsion rates were 15.1 ± 2.2 . The net rate of removal per 100 first insertions was 17.4 ± 2.3 for medical reasons and 5.5 ± 1.4 for reasons not relevant to

the acceptability of the loop. The cumulated net continuance rate at 1 year was 63.8 ± 2.9 per 100 first insertions. This rate underestimates effective continuance because reinsertions were made during the study period, but it still exceeds the 51 percent continuance rate for oral contraceptives in the same population.

Although acceptance of intrauterine contraception decreased in time, it remains the most effective method of birth control offered to this population. Continued refinements in the design of intrauterine devices so that side effects will occur less frequently should increase the acceptance and prolong the use of these devices in the future. More intensive followup of the women accepting the device, wherever possible, might also prolong use.

REDYS, JOHN J. (Connecticut State Department of Health), **HIBBARD, EVELYN W.**, and **BORMAN, EARLE K.:** *Improved dry-swab transportation for streptococcal specimens. Public Health Reports, Vol. 83, February 1968, pp. 143-149.*

Exposure under controlled conditions of group A streptococci to relative humidities of 25 and 95 percent at holding temperatures of 50°, 68°, and 86° F. led to the development of a disposable and inexpensive dry-

swab outfit for collecting and transporting throat swabbings. The outfit provides for immediate and continuous contact of the material collected on dry swabs from suspected throats with a silica gel desiccant in a sealed,

Kraft-laminated-to-foil pouch. Recoveries in a central laboratory of group A streptococci in delayed cultures (1 to 3 days after collection) were consistently and significantly greater with such outfits than when similar outfits without silica gel were used. Assembly of the outfit is convenient for laboratory personnel, it stores compactly in a physician's office or in his bag, and the components are available commercially.

BRUBAKER, MERLIN L. (Public Health Service Hospital, Carville, La.), and **JOHNWICK, EDGAR B.:** *Ten-year review of hospital admissions of patients with leprosy. Public Health Reports, Vol. 83, February 1968, pp. 155-160.*

From July 1, 1955, through June 30, 1965, there were 362 first admissions to the Public Health Service Hospital at Carville, La. Of these, 25 persons were eliminated from this study because of inadequate or unsatisfactory data.

Among the 337 patients remaining in the study were approximately twice as many males as females. The average age at the time of admission was 38.2 years. The youngest patient was a girl 8 years old, and the oldest was a man of 83. Of the cases studied, 244, or 72.3 percent, were lepromatous; 44, or 13 percent, were dimorphous; 46, or 13.6 percent, were tuberculoid; and three, or 1 percent, were indeterminate.

Patients born in the continental United States included 81 from Texas, 23 from Louisiana, 11 from Florida, and 41 from 23 other States. Of 181 patients from outside the contiguous States, 60 were born in

Mexico, 27 in Puerto Rico, 16 in the Philippines, 13 in various Pacific Islands, 12 in Central or South America, 12 in Asia, 10 in Hawaii, seven each in Cuba, India or Pakistan, and Europe, six in the Caribbean area, three in Africa, and one in the Near East.

Half the patients born in the continental United States denied knowledge of the source of their infection. Among the patients born elsewhere, 27.6 percent reported that they had contracted the disease from other patients. Of these, 72.4 percent came from areas where leprosy is endemic. The source of their disease was unknown by 23 percent of the entire study group.

Among the 337 first admissions, 46 patients were World War II veterans, 13 of whom were born outside the United States in areas where leprosy is endemic. Most veterans born in the United States served in

the Far East. The racial distribution of the 46 veterans was 35 white, six Asian, and five Negro. The distribution for all patients admitted during the period was 271 white, 35 Asian, and 31 Negro.

More than 50 percent of the patients sought medical advice because they had neurological symptoms denoting anesthesia or paresthesia. Macular lesions, present in 34.6 percent of the patients, were the type most frequently observed.

The average delay was 14.5 months from the onset of a symptom until the patient visited a physician. An average of 17.4 months elapsed from the time a physician was consulted until the diagnosis was established. The period from diagnosis to admission to the Public Health Service Hospital at Carville averaged 19.4 months.

In differential diagnosis prompt consideration of leprosy is imperative to effect early treatment. When it is diagnosed early and treated appropriately, leprosy can be cured, deformity prevented, the source of infection eliminated, and the reservoir reduced.